EVALUATION CRITERIA FOR MEETING THE DEPARTMENT OF COMMERCE INFORMATION TECHNOLOGY ARCHITECTURE REQUIREMENTS

The following are the evaluation criteria against which: (1) bureau Information Technology (IT) Architecture efforts and status will be measured, and (2) individual IT Architectures will be evaluated. An Architecture Development Checklist and selected definitions are also provided.

General Bureau Requirements

1. Each bureau must have one or more IT architecture(s) in place to cover all of its organizations and operations.

2. Where the bureau does not use one IT Architecture for all of its organizations and operations, the Architectures used should be based on business processes within the bureau. If the business process in question involves other bureaus or organizations, the Architecture should be developed with the entirety of the operation in mind. If one Architecture for an inter-organizational business process is not possible (e.g., due to non-cooperation of other organizations), the bureau's business process Architecture should be coordinated with those organizations to the greatest degree possible.

3. To be compliant with Departmental requirements an organization or process must have an IT Architecture "in place", but this does not mean that it must have fully migrated to a target architecture. Since an IT Architecture needs to be frequently updated, full "implementation" of the contents of a changing target architecture may never take place. Compliance will entail the development of the architectural documents and clear progress towards the target architecture.

4. Each bureau must be able to provide IT Architecture documentation to the Departmental Chief Information Officer upon request.

5. The IT Architecture(s) must comply with the requirements set forth below for individual Architectures.

IT Architecture Requirements

The following identify what elements or characteristics an IT Architecture must have to meet the Departmental Requirements.

1. The IT Architecture must be documented. A *de facto* Architecture is not sufficient.

2. To be complete an Architecture must deal with:

   - the business processes performed, how they are organized, and where they take place;
   - the data sets and information flows needed to perform the activities;
   - the applications and software needed to capture and manipulate the information sets; and
   - the technology (computer hardware, network, telecommunications) needed to run the applications.

   An IT Architecture that only deals with hardware and software standards will be considered as only minimally complete. The involvement of programmatic people, rather than just the information technology staff, is necessary for the development of a complete and effective architecture.

3. To be complete the Architecture must cover all of the organization or business process(es) within the defined scope for that Architecture. Architectures reflecting only part of the organization or process(es) within the scope will be considered only minimally complete.

4. The IT Architecture must be consistent with the organization's Strategic Plan, Strategic IT Plan, and Operational IT Plan, as well as with the Department of Commerce Plan for a "Digital Department".

5. IT Architecture documentation should normally include the documents listed below or equivalents. Alternative or minimized forms of documentation must obtain the prior approval of the Departmental Chief Information Officer.

   - IT Principles to provide basic ground rules for the designing, building, acquiring, or re-engineering of IT systems;
   - a Baseline Architecture showing the architecture at the start of the process;
   - a Target Architecture showing the desired architecture; and
   - a Migration Plan that shows how the organization or business operation intends to implement its Architectural goals (e.g., how a Target Architecture will be implemented). Since an IT Architecture should be periodically revised (see below), it is unlikely that many Architectures will ever be implemented so completely that no Migration Plan at all would be needed. Such a situation would probably be an indicator that the Architecture needs review.

6. There is no set requirement for how far into the future Target Architectures and Migration Plans must look. Target Architectures usually should be looking three to five years into the future. Migration Plans, detailing more specific information, may deal with a shorter time frame.

7. IT Architectures must be updated on a periodic basis. Presentation of an Architecture last updated years ago would be unacceptable.

8. An IT Architecture should conform with any Department-wide standards unless waivers have been granted.

9. Individual IT Architectures will be evaluated on the basis of whether they: are complete, take into account changing technology and business drivers, contain realistic migration plans, and reflect a true commitment to implementation by the organization or processes. The objective is to improve Departmental services and products through optimal use of Information Technology, not to produce sets of documents. Given this objective, there will be some subjectivity involved in analyzing specific IT Architectures.

Architecture Development Checklist	
1. Identify business processes that will be the bases for architectures if more than one architecture will be done for the bureau.	
2. Develop basic ground rules for the designing, building, acquiring, or re-engineering of IT systems, and document as "Architectural Principles".	
3. Ensure that the IT Architecture Principles and other Architecture efforts are consistent with the organization's Strategic Plan, Strategic IT Plan, and Operational IT Plan, as well as with the Departmental goal of achieving a "Digital Department".	
4. Characterize and document as the "Baseline Architecture": • the current business activities (work) performed, how they are organized, and where they take place; • the data sets and information flows needed to perform the activities; • the applications and software needed to capture and manipulate the information sets; and • the technology (hardware, network, communications) needed to run the applications.	
5. Develop a model of what the IT Architecture should be in the future and document as "Target Architecture".	
6. Perform a gap analysis showing where the Baseline Architecture and the Target Architecture differ.	
7. Develop a plan to close the gaps between the Baseline and Target Architectures, document as "Migration Plan". The Plan should include: • assignments of responsibilities, and • milestones for achieving steps in the migration.	
8. Create a Technical Reference Model or standards profile to guide acquisitions in a way consistent with the Target Architecture and Migration Plan.	
9. Begin implementation of the Migration Plan.	

Definitions

IT Architectural Principles - Statements that provide basic ground rules for the designing, building, acquiring, and re-engineering of IT systems. These can help to provide a context for specific architectural decisions made later in the process and also help to make those decisions consistent. A few examples of principles are:

- that open systems must be used to the maximum extent possible and that proposals for proprietary systems must be approved at a higher (defined) authority;
- that COTS (commercial off-the-shelf software) be given preference; and
- that any development activity must consider the impact of the activity on existing networks.

Baseline Architecture - A characterization of the current architectural status that provides enough data to understand the current IT situation and the related problems that exist. The word "characterization" is used because it usually is unnecessary to identify and analyze everything IT or information-related in the organization.

Business Process - A defined business activity with clearly defined inputs and outputs, which usually delivers a product or service or suite of products and services to the public, other agencies, or other portions of the agency. Within NOAA, for example, the management of commercial fisheries could be considered one business process, while the development and distribution of nautical charts could be another.

Migration Plan - A document identifying how the gap between the Baseline Architecture and Target Architecture will be bridged. It should identify the processes for making the migration, assign responsibilities, set priorities, and contain a schedule.

Target Architecture - A model of how the architecture should look in the future (three to five years), taking into account business and technology drivers. The model identifies the general types and attributes of data, IT equipment, software, etc., needed to support the current and planned business process, and how they inter-relate.

Understanding the concept of a Target Architecture is key to the architectural process. It is the concept most likely to be misunderstood, and if it is then the architecture effort is unlikely to produce real benefits. So it is important to first understand what a Target Architecture is **not**. It is **not** a procurement plan listing the specific IT equipment, software, services, etc., you want to buy in the future. It is **not** a list of standards for equipment or software acquisition.

As stated above, a Target Architecture **is** a model of the general types and attributes of IT equipment, software, etc., needed to support the current and planned business process, and how they inter-relate. Any procurement list that extends beyond a year or so is of dubious value for most organizations, but a model showing the functionality needed and sought will usually have the long-term value of guiding the development of specific standards or procurement decisions and keeping the essential roles of and relationships between IT resources clearly in mind. If newer

versions of software being used come out, for instance, the Target Architecture would probably remain unchanged unless the capabilities of the software would change the way in which work processes take place, because the Target Architecture is focused on the role of that software rather than the specific version or even brand name.

As part of the migration and implementation plans for an IT Architecture, an organization would often create a standards profile and/or Technical Reference Model, which would translate the goals of the Target Architecture into specific standards to be followed. These documents, however, don't attempt to reach out as far into the future with such specifics but can be changed fairly frequently.

A simple but specific example should help to clarify what this means. The Target Architecture may identify electronic mail as an essential supporting application and specify its current or future function in supporting the business processes. It would not identify any specific e-mail system. The standards profile and/or Technical Reference Model would identify the system after appropriate analyses of specific options has taken place, reflecting capabilities and costs at the time of the decision-making. As such decisions are made, however, the Target Architecture helps to analyze how the decision may impact other portions of the current or future IT structure, data requirements, etc., helping to ensure that decisions aren't made with too narrow a focus.

Technical Reference Model (TRM) - A TRM is a model providing the basic ground rules and standards for designing, developing, acquiring, implementing, testing, and integrating IT systems. It can generically identify the various software, hardware, and interfaces needed for the organization or business operation (usually already identified in the Target Architecture), and then identify acceptable options within the IT Architecture for filling these needs. There may be a single standard for some elements and a range of acceptable options for others. The Technical Reference Model aids in showing how elements of the architecture fit together, guides the acquisition of IT products and services in accordance with the Migration Plan, and helps provide a base for future architectural changes.